Staphylococcus succinus Infective Endocarditis, France

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Infective endocarditis is a rare condition in humans and is associated with high illness and death rates. We describe a case of infective endocarditis caused by *Staphylococcus succinus* bacteria in France. We used several techniques for susceptibility testing for this case to determine the oxacillin profile.

Staphylococcus succinus was first described in 1998 and was isolated from 25- to 35-million-year-old Dominican amber (*1*). Members of this species are widespread in nature. Studies have reported the frequent isolation of *S. succinus* bacteria from various sources, such as cheeses, dry or fermented meat products, the Dead Sea, and occasionally human specimens (*2*–*4*). We report a case of *S. succinus* infective endocarditis in a patient in France who had many cardiovascular risk factors: age, sex, hypertension, dyslipidemia, diabetes, and weight. In accordance with legislations in France and Europe, the use of anonymous data does not need approval of an ethics committee.

On hospital day 1, an 83-year-old man sought care for dyspnea and chest pain for 72 hours; he had evidence of global cardiac decompensation for a severe ischemic heart disease with preserved left ventricular ejection fraction. Cardiac blood marker analysis revealed an increased troponin level to 250 ng/L and thereafter 350 ng/L (reference range <14 ng/L). Electrocardiogram results showed ST-segment depression in the lateral leads. In this context of non–ST-segment elevation myocardial infarction, the patient was hospitalized in the cardiology unit. On day 6, transthoracic echocardiography revealed an aortic valve bioprosthesis, reshaped, with a thickening of the cusps and a vibratory element attached on the ventricular side (7 × 4 mm), suggesting vegetation suspicious for infective endocarditis (Appendix Figure, https://wwwnc.cdc.gov/EID/article/30/2/23-0986-App1.pdf). The patient became febrile. We collected a total of 7 sets of aerobic and anaerobic blood bottle cultures during days 9–12; all showed a gram-positive coccus in clusters. Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry identification (VitekMS; bioMérieux, https://www.biomerieux.com) indicated *S. succinus* with a 99.9% index.

The patient initially received 6 g intravenous cefazolin; on day 13 we changed the antimicrobial treatment to intravenous daptomycin (10 mg/kg) and gentamicin (3 mg/kg) every 48 h. Finally, after a dedicated endocarditis multidisciplinary consultation, we changed the patient's regimen on day 22 to daptomycin (10 mg/kg) and rifampin (900 mg) for 6 weeks. The patient returned home; follow-up care was scheduled with a hospital at home. The patient outcome was favorable without relapse or side effects from daptomycin/rifampin. His last cardiology appointment was 11 months after his initial treatment; no sequelae of endocarditis were present.

S. succinus susceptibility testing was a challenge. We performed methicillin resistance testing with cefoxitin screen and oxacillin testing using the AST-P668 bioMérieux card with a VitekXL automated system. However, we observed a discrepancy between the results from the 2 tests. To confirm oxacillin resistance, we tested by agar diffusion method using impregnated disks and interpreted them in accordance with EUCAST (European Committee on Antimicrobial Susceptibility Testing) criteria (https://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Breakpoint_tables/v_13.0_Breakpoint_Tables.pdf). We used oxacillin (1 μg) and cefoxitin (30 μg) disks (Bio-Rad, https://www.bio-rad.com). The oxacillin (1 μg) disk diffusion method detected oxacillin resistance. In contrast, the isolate was susceptible when we used the cefoxitin (30 μg) disk test. In addition, we performed an oxacillin MIC strip test; MIC of 0.5 (mg/L), indicated that the strain was susceptible according to the EUCAST 2022 criteria.

A retrospective study (*5*) of penicillin-binding protein (PBP) assays indicating antimicrobial drug resistance has shown that preinduction with cefoxitin/oxacillin and reading of the test after 10 min (instead of 5 min) substantially improve the sensitivity, specificity, and robustness of the immunochromatographic assay PBP2a (Abbott, https://www.globalpointofcare.abbott) for coagulase-negative staphylococci.

We performed PBP2a detection from bacterial culture after a preinduction with cefoxitin, but results were negative. Thereafter, we performed *mecA* gene detection by PCR to identify oxacillin-resistant *Staphylococcus* (*6*); however, we did not detect the *mecA* gene by PCR.

Finally, we sent the isolate to the French Reference Center for *Staphylococci* (Lyon, France) on day 19 for detection of other *mec* genes; this test result was negative. Staff at the reference center performed whole-genome sequencing of the strain as previously described (*7*); results revealed no site-specific insertion sequences comprising direct-repeat sequences typical of a staphylococcal cassette chromosome–like cassette (*8*). To evaluate the possibility of resistance by PBP modification, we performed a disk diffusion method for antimicrobial susceptibility of imipenem (PBP1), cefotaxime (PBP2), oxacillin (PBP3), and cefoxitin (PBP4) (*9*,*10*). The cefotaxime diameter was reduced, indicating resistance in a strain, most likely by a modification of PBP2 (Figure; Appendix Table).

In conclusion, we identified environmental *S. succinus* behaving as an opportunistic pathogen as the cause of infective endocarditis in a patient with many cardiovascular risk factors. The source of *S. succinus* was not clearly established. Virulence factors contributing to *S. succinus* pathogenicity are not yet well defined. We further described the difficulty of determining the resistance profile of this rarely pathogenic species mimicking either the borderline oxacillin-resistant *S. aureus* phenotype with an elevated oxacillin MIC value, or to a lesser extent the modified *S. aureus* phenotype in the absence of *mec* gene–mediated resistance. Our findings highlight the importance of a multiple-technology approach for laboratories assessing methicillin resistance using a combination of phenotypic and genotypic methods.

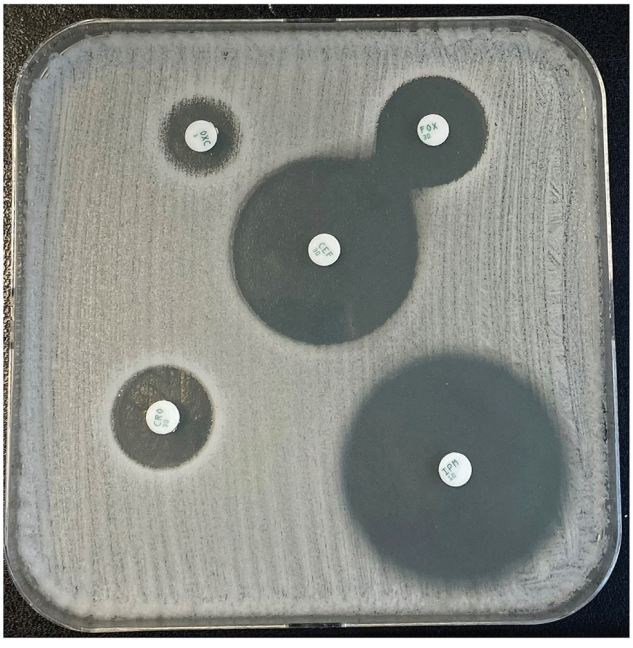

Figure. Disk diffusion testing for antimicrobial susceptibility testing of *Staphylococcus succinus* from a patient in France with infective endocarditis. Agar diffusion method using impregnated disks was interpreted according to the criteria of the European Committee on Antimicrobial Susceptibility Testing 2022 (version 13.0) breakpoints for oxacillin susceptibility testing (https://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Breakpoint_tables/v_13.0_Breakpoint_Tables.pdf). CEF, cephalotin; CRO: cefotaxime (PBP2); FOX, cefoxitin (PBP4); IMP, imipenem (PBP1); OXC, oxacillin (PBP3); PBP, penicillin-binding protein.

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This study has been recorded in the Nantes Hospital by the local Data Protection Officer under reference TS005-BIO-AP-2019_20. In accordance with legislation in France and Europe, use of anonymous data does not need approval of an ethics committee.

About the Author

Dr. Ruffier d'Epenoux is a medical microbiologist at Nantes University Hospital, Nantes, France. Her primary research interests are device-related infections, especially bone and joint infection (*Cutibacterium acnes*) and prosthetic infective endocarditis.

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Inadvertent Platelet Transfusion from Monkeypox Virus–Infected Donor to Recipient, Thailand, 2023

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In Thailand, platelet product from a blood donor was transfused to a recipient who had dengue. Two days later, the donor was confirmed to have monkeypox virus infection. Monkeypox virus DNA was undetectable in recipient specimens up to 2 weeks after transfusion. The recipient remained asymptomatic at 4 weeks of monitoring.

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Monkeypox virus (MPXV), a double-stranded DNA virus that primarily infects rodents in sub-Saharan Africa, causes mpox disease. MPXV is a member of the genus *Orthopoxvirus* in the family *Poxviridae*. MPXV clade I is endemic to Central Africa and clade II to West Africa. Clade II is further subdivided into IIa and IIb. Strains from the recent global emergence appear to belong to clade IIb (https://nextstrain.org/mpox/all-clades).

The potential to unknowingly transmit MPXV from donated blood products exists despite routine stringent screening of bloodborne pathogens at donation centers. Thailand first reported mpox in a 27-year-old male tourist from Africa in Phuket province on July 21, 2022; nonoutbreak sporadic infections have since been identified (*1*). By May 2023, ≈40 infections had been laboratory-confirmed. Infections surged after Pride Festivals, which took place in Bangkok and Pattaya City in June 2023; infections peaked in August and then declined. As of November 4, 2023, the Ministry of Public Health Thailand (MoPH) had identified 582 infections (563 male and 19 female patients; median age 33 years, age range 1–64 years) and 2 deaths. Here, we describe an unintended administration of platelets from an MPXV-infected donor to a dengue-infected recipient and the subsequent follow-up to monitor for potential MPXV transmission.

On July 24, 2023, an apparently healthy 22-year-old man donated whole blood at the National Blood Center (NBC) of the Thai Red Cross in Bangkok (Figure). That afternoon, he experienced fever and malaise. On July 26, itchy skin rash and lesions appeared on his hands, feet, and anus, which prompted him to go to a hospital. His doctor sought consultation with the Department of Disease Control at MoPH, where samples of the skin lesion, oropharyngeal swab, and plasma were tested for MPXV by real-time PCR to detect the F3L gene region (BioPerfectus, https://www.bioperfectus.com). MPXV DNA was detected only in the lesion (cycle threshold [Ct] 21.7) and oropharyngeal (Ct 31.5) swab samples.

NBC processes blood donations individually and routinely screened for hepatitis B/C and syphilis. Derived products from donations are primarily leukocyte-poor red cells, leukocyte-depleted pooled plate-